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Mini review

Managing voiding dysfunction in young men[☆]Po-Cheng Chen^a, Chung-Cheng Wang^{a,b,*}^a Department of Urology, En Chu Kong Hospital, College of Medicine, National Taiwan University, Taipei, Taiwan^b Department of Biomedical Engineering, Chung Yuan Christian University, Chung-Li, Taiwan

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ABSTRACT

Voiding dysfunction is an uncommon condition in young men. With increased understanding of the etiology of chronic lower urinary tract dysfunction, there has been significant improvement in the management of the condition. We have reviewed the current literature and make suggestions about diagnosis, treatment, and further research on this topic. We searched the PubMed database for the management of voiding dysfunction in young men using the following terms: voiding dysfunction, lower urinary tract symptoms, young men, risk factor, urodynamics study, uroflowmetry, magnetic resonance imaging, primary bladder neck obstruction/bladder neck dysfunction, dysfunctional voiding/pseudo-dyssynergia, impaired detrusor contractility/detrusor underactivity, adrenergic antagonist, transurethral incision, urotherapy, baclofen, and botulinum toxin. Uroflowmetry is an important noninvasive examination for screening young men for possible voiding dysfunction. A videourodynamic study is recommended for patients with low urine flow. Primary bladder neck obstruction and dysfunctional voiding are the two most common diagnoses. α -Adrenergic antagonists and urotherapy are widely used for treating bladder neck obstruction and dysfunctional voiding, respectively. Botulinum toxin A may become a potential therapeutic option in the future. Although the published reports usually included a small number of patients and lacked randomization and a placebo-controlled group, these clinical studies still provide great advances in managing voiding dysfunction in young men. Further well-designed studies are warranted to support optimal management of these conditions.

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1. Introduction

Voiding dysfunction is defined by the International Continence Society and International Urogynecological Association as “abnormal, slow, and/or incomplete micturition” as diagnosed by symptoms and urodynamic investigations.¹ Abnormal, slow urine flow rates and abnormally high post-void residuals are the basis of this diagnosis, which should be based on repeated measurements to confirm abnormality. Lower urinary tract symptoms (LUTSs) is the term used to describe all types of voiding dysfunction, although no such correlation exists between symptoms and underlying pathophysiology.² In older men, an enlarged prostate usually contributes to LUTSs, but only about one-third of the men with LUTSs >55 years of age meet the diagnostic criteria for benign prostatic obstruction. About half of the men have detrusor overactivity and a smaller number have detrusor underactivity.³ Although chronic LUTSs are not uncommon, young men are usually empirically

diagnosed as having chronic prostatitis, prostatodynia, or psychological voiding dysfunction because of negative findings on the physical or laboratory examinations.^{4,5} Consequently, the treatments are usually empirical, and most physicians and patients consider the results unsatisfactory. The purpose of this paper is to review the current literature to find accurate diagnostic techniques for voiding dysfunction in young men and make recommendations concerning treatment and further research.

2. Epidemiology

There is no consensus on the cutoff point between young men and older men. Nitti et al⁶ arbitrarily defined young men as aged <45 years, whereas Wang et al⁷ from Taiwan and Toh and Ng⁸ from Singapore defined young men as aged 18–50 years. Karami et al⁹ used the narrowest range of age between 18 years and 40 years to define young men.

2.1. Risk factors for voiding dysfunction in young men

To the best of our knowledge, there has not been a large, community-based study to investigate the risk factors for chronic

* Corresponding author. Department of Urology, En Chu Kong Hospital, Number 399, Fuxing Road, Sanxia District, New Taipei City, Taiwan.

E-mail address: ericwcc@ms27.hinet.net (C.-C. Wang).

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Table 1

Summary of the videourodynamic study findings in young men with chronic voiding dysfunction.

Study	Country	Patient no.	Patient age (mean, range, years)	PBNO (%)	DV (%)	IDC (%)	DO (%)
Kaplan et al, 1996 ⁵	America	137	<50	54	24	17	49
Nitti et al, 2002 ⁶	America	85	35.1, 18–45	47	14	9	6
Wang et al, 2003 ⁷	Taiwan	90	37.5, 18–50	41	43	10	37
Toh and Ng, 2006 ⁸	Singapore	50	38.1, 17–49	28	No data	10	18
Karami et al, 2011 ⁹	Iran	456	25.8, 18–40	21	15	2	14

Data are presented as % unless otherwise indicated.

DO = detrusor overactivity; DV = dysfunctional voiding; IDC = impaired detrusor contractility; PBNO = primary bladder neck obstruction.

voiding dysfunction in young men. Bellina et al¹⁰ showed that dysfunctional voiding may arise in women who work long hours and choosing not to urinate. Yang et al¹¹ reported a similar finding that 21% of young men with voiding dysfunction had habitually neglected to urinate despite a full bladder because they were busy with work. Fan et al¹² showed that women (mean age 48 years) with dysfunctional voiding experienced a greater degree of depression and anxiety as compared to asymptomatic controls, but the psychological profiles of young men with chronic voiding dysfunction are unknown. In type 2 diabetic patients aged <45 years, even though the LUTSs are more common than in the control group, the peak urinary flow rate (Qmax) and post-void residual (PVR) are similar in both groups, indicating that diabetes is not a risk factor for voiding dysfunction in its early stages.¹³

2.2. Prevalence of voiding dysfunction – symptoms

Using a symptom-based definition, several epidemiological surveys have revealed that the prevalence of all urinary symptoms has increased linearly with age.^{14,15} The EPIC (European Prospective Investigation of Cancer and Nutrition) study, an international, cross-sectional study of 19,165 men and women, showed that the prevalence of slow stream was 3.9% in men aged <40 years, 7.4% in men aged 40–59 years, and 18.9% in men aged >59 years.¹⁴ The prevalence of any voiding symptom was 19.9%, 24.1%, and 37.2% in men aged <40 years, 40–49 years, and ≥60 years, respectively. In another study for young asymptomatic men, Mueller et al¹⁵ found that 2% of men aged 18–29 years reported moderate symptoms [International Prostate Symptom Score (IPSS) >7] and 12% of men aged 40–49 years also reported having moderate symptoms. Interestingly, only 1% of men aged 18–29 years reported weak stream, but of the men aged 40–49 years, 4% reported weak stream. Moon et al¹⁶ also surveyed 184 men aged 20–49 years from a National Guard unit and reported that 5% of those aged 20–29 years, 12% of those aged 30–39 years, and 14% of those aged 40–49 years had an IPSS of ≥8. These data suggest that although LUTSs in young men are less common than in older men, bothersome LUTSs are not as rare in young men as many physicians think.

2.3. Prevalence of voiding dysfunction – urodynamic studies

It is difficult to identify the real pathophysiology of voiding dysfunction based on symptoms alone. Although there is some consensus regarding the definition of voiding symptoms, there is no such consensus regarding urodynamic studies. The prevalence of voiding dysfunction varies depending on the definition of Qmax and PVR used. Wang et al⁷ defined low uroflow Qmax as <15 mL/s. Karami et al⁹ further demonstrated that Qmax, in most patients with various voiding dysfunctions, was <15 mL/s. However, it is difficult to have a clear cutoff value of PVR to define voiding dysfunction because many studies have shown a wide range of PVRs in patients with voiding dysfunction.

The true prevalence of voiding dysfunction in the young male population is unknown, because it is impossible and impractical

to perform a comprehensive urodynamic evaluation in a community setting. The best epidemiological findings available are based on incidence rates in specific outpatient populations. Table 1^{5–9} summarizes the etiologies of chronic lower urinary tract dysfunction in young men.^{5–9} In 1996, using videourodynamic study (VUDS) in 137 men aged <50 years with chronic LUTSs, Kaplan et al⁵ retrospectively identified 74 (54%) patients with primary bladder neck obstruction (PBNO), 33 (24%) with dysfunctional voiding (DV), and 23 (17%) with impaired detrusor contractility (IDC). In 2002, Nitti and colleagues⁶ prospectively reported a 47% incidence of PBNO and 14% of DV in a study of 85 men aged 18–45 years with LUTSs. Recently, in a large prospective study of 456 men (18–40 years old) with chronic LUTSs, Karami and colleagues⁹ reported PBNO in 96 cases (21%), DV in 69 (15%), and underactive detrusor in 11 (2.4%). These data would appear to support PBNO and DV as being the two most common urodynamic diagnoses in young men with chronic voiding dysfunction.

3. Diagnosing voiding dysfunction in young men

The diagnosis of voiding dysfunction in young men depends on both the patient's symptoms and the results of the lower urinary tract investigations. LUTSs comprise storage symptoms, voiding symptoms, and post-micturition symptoms. However, clinical symptoms are not helpful in predicting a specific urodynamic finding. In a Taiwanese study, the IPSS of patients with PBNO was comparable with the IPSS in patients with DV (20.3 ± 5.5 vs. 18.1 ± 5.3 , $p = 0.87$).⁷ In an Iranian study, the IPSS of patients with PBNO and DV was almost identical (20.3 ± 7.3 vs. 20.1 ± 6.9 , $p = 0.75$).⁹

Several medical diseases may coexist in young men with voiding dysfunction. Symptoms of urinary tract infection, a positive urinalysis, and urine culture results suggest cystitis or prostatitis. History and signs of possible neurological diseases suggest neurogenic bladder. A voiding diary may disclose nocturnal polyuria and global polyuria, which possibly imply many medical diseases, such as diabetes mellitus, diabetic insipidus, and peripheral edema. Radiological exams (kidney, ureter, and bladder X-ray films) may demonstrate vesical stones that usually occur in older men, but can be found in young men with voiding dysfunction. Young men with a vesical stone should be evaluated with uroflowmetry to identify the possible voiding dysfunction.¹¹ Nitti et al⁶ advocated that VUDS was a recommended test in young men with abnormal urine flow and a high voiding score. Therefore, uroflowmetry is an important and noninvasive examination to screen patients with possible voiding dysfunction.

3.1. Videourodynamic studies

Without a doubt, VUDS is the most accurate diagnostic tool for young men with chronic voiding dysfunction. VUDS adds the anatomical perspective of lower urinary tract dysfunction to the conventional urodynamic study. Using fluoroscopic imaging, the level of obstruction can be easily localized.

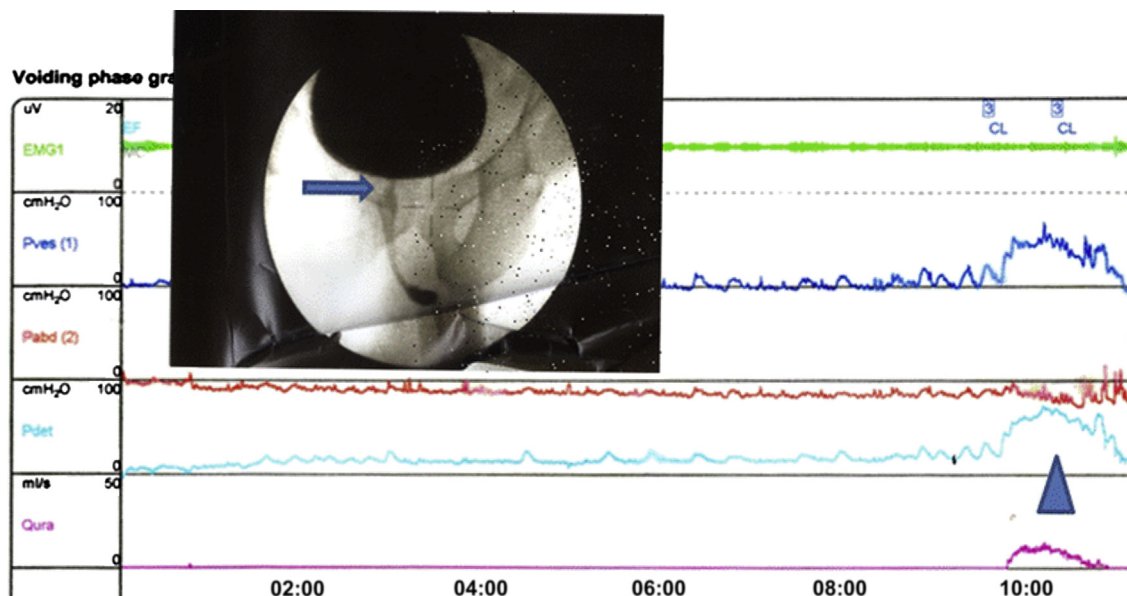


Fig. 1. Primary bladder neck dysfunction in a 46-year-old man with chronic lower urinary tract symptoms and low urinary flow rate. This represents classic high-pressure, low-flow obstruction (arrowhead) with obstruction at the bladder neck when voiding on fluoroscopy (arrow).

PBNO, DV, and IDC are the three most common VUDS diagnoses.^{5–9} Traditionally, PBNO is defined as a narrowing only at the vesical neck on a fluoroscopic voiding cystourethrogram, sustained high detrusor pressure during voiding, low Qmax, obstructive flow pattern, and relaxed external sphincter electromyography.⁷ Fig. 1 shows a typical high-pressure, low-flow obstructive pattern and fluoroscopy revealed a narrowing of the bladder neck during the voiding phase. Nitti et al⁶ further categorized PBNO into three distinct types: (1) classic high-pressure low flow; (2) normal-pressure low flow with narrowing at the bladder neck; and, (3) delayed opening of the bladder neck.⁶ All three conditions represent vesical neck dysfunction causing an obstruction.

Dysfunctional voiding has been described by various terms including external sphincter spasticity, nonrelaxing external urethral sphincter, pseudodyssynergia, and learned voiding dysfunction. DV is

defined as an obstruction at the external sphincter determined by intermittent narrowing of the membranous urethra on fluoroscopy and/or an intermittent increase in sphincter electromyography (EMG) during a sustained voluntary detrusor contraction in the absence of abdominal straining.⁷ Fig. 2 shows a 38-year-old man with DV and detrusor overactivity. The VUDS showed involuntary detrusor contraction during filling cystometry and high-pressure low-flow obstruction at the external sphincter when voiding on fluoroscopy. This diagnosis should be made in a neurologically normal man. The same urodynamic finding in men with a known neurological disease could be named as “detrusor external sphincter dyssynergia”. Recently, the diagnostic criteria for DV were modified by Brucker and colleagues.¹⁷ They suggested that the urine flow from VUDS might be correlated with the noninvasive urine flow findings in patients with DV. In cases in which intubated urine flow suggested DV, but the

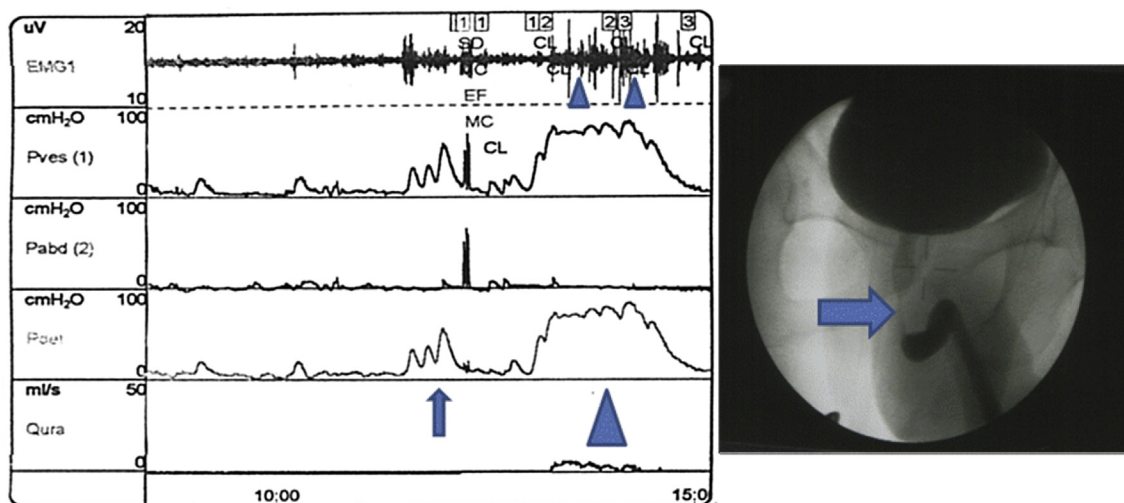


Fig. 2. Dysfunctional voiding in a 38-year-old man with chronic lower urinary tract symptoms and staccato urinary flow rate. This represents classic high-pressure, low-flow obstruction (large arrowhead) with obstruction at the external sphincter (large arrow) when voiding on fluoroscopy. Intermittent increase in sphincter electromyography (small arrowheads) during voiding is noted. In addition, cystometry tracing demonstrated the occurrence of involuntary detrusor contraction, which is compatible with detrusor overactivity (small arrow).

Table 2Summary of results of α -blocker treatment in young men with primary bladder neck obstruction.

Trial	Patient no.	Medication and dose	IPSS	Qmax (mL/sec)	PVR (mL)
Trockman et al, 1996 ²⁴	7	5 mg terazosin at bed time or 2 mg prazosin twice daily	Baseline: 18.6 \pm 4.6 Post-Tx: 10.3 \pm 9.9	Baseline: 11 \pm 3.6 Post-Tx: 22.1 \pm 13.9	Baseline: 65 \pm 62 Post-Tx: 45 \pm 30
Yang et al, 2002 ¹¹	24	Doxazosin 1 mg or 2 mg at bed time for 3 mo	Baseline: 18.3 \pm 4.6 Post-Tx: 11.6 \pm 5.2	Baseline: 11.8 \pm 3.2 Post-Tx: 15.9 \pm 3.9	Baseline: 80 \pm 17 Post-Tx: 49 \pm 10
Cisternino et al, 2006 ²⁵	41	Alfuzosin 5 mg, tamsulosin 2 mg daily Mean treatment time 16 mo (6–24)	Baseline: 18.6 Post-Tx: 10.3	Baseline: 8.5 Post-Tx: 14	Baseline: 64 Post-Tx: 40
Li et al ²⁶	24	Doxazosin 4 mg daily Mean treatment time: 15.2 mo	Baseline: 17.7 \pm 4.2 Post-Tx: 10.1 \pm 4.7	Baseline: 11.4 \pm 2.9 Post-Tx: 15.4 \pm 3.6	Baseline: 79 \pm 33 Post-Tx: 50 \pm 23

Data are presented as mean \pm SD, unless otherwise indicated.

IPSS = International Prostate Symptom Score; PVR = postvoiding residuals; Post-Tx = post-treatment; Qmax = peak urinary flow rate.

noninvasive urine flow did not, the DV was considered to be test induced, and these patients were not diagnosed with DV. Thus, in doing VUUS, some investigators prefer a suprapubic catheter to a transurethral one in order to avoid increasing the sympathetic tone in the male urethra induced by the urethral catheter.⁷ Therefore, PBNO or DV may not be overdiagnosed.

Impaired detrusor contractility is defined as a detrusor pressure <30 cmH₂O, Qmax <15 mL/s, and no obstruction identified radiologically.⁷ In young men with symptomatic voiding dysfunction, 2–17% IDC has been present (Table 1). The common etiologies of IDC in older men include diabetes mellitus, stroke, the aging process, and untreated severe benign prostatic obstruction. Widespread degeneration of muscle cells and axons, superimposed on the dense band pattern, is proposed as the structural correlate of IDC in the aging detrusor.¹⁸ However, the etiology in these young populations was unclear because none of the patients had obvious evidence of neurological disease or associated medical comorbidities.

3.2. Other diagnostic tools

Cystoscopy may be helpful in finding bladder trabeculation or diverticulum, which is used to confirm bladder outlet obstruction or rule out other problems such as urethral stricture, urethral stone, foreign bodies, or congenital posterior urethral valve. However, it has little role in making a differential diagnosis of PBNO and DV.

The role of spinal magnetic resonance imaging (MRI) is limited for detecting spinal cord lesions in patients with normal neurological and lower spine examinations. Mak and Rodomski¹⁹ prospectively evaluated 30 patients (mean age 32.2 years) with voiding dysfunction and normal neurological examinations. Of them, 18 had incontinence, nine had frequency and urgency alone, and three had urinary retention. Only one patient had a tethered cord identified by MRI. Recently, Broughton et al²⁰ have shown that the diagnostic value of lumbosacral MRIs is extremely low (2%) in children (mean age 8.5 years) with isolated dysfunctional elimination problems, and normal neurological, orthopedic, and back examinations. Afshar et al²¹ further advocated that abnormal cutaneous findings in the back are associated with abnormal MRI findings. Although the probability of a positive MRI may be increased with proper patient selection, a spinal MRI has a low impact in the management of lower urinary tract dysfunction.

4. Treatment of voiding dysfunction in young men

The treatment options for voiding dysfunction in young men include watchful waiting, conservative treatment, medical treatment, and surgical treatment. Watchful waiting is indicated in patients without obvious symptoms and without evidence of upper or lower urinary tract function deterioration. Recently, Minassian et al²² have demonstrated that dysfunctional voiding in childhood may

predict bladder control problems as the child becomes a woman, including urge incontinence and mixed incontinence. However, the natural history in young men is unknown. In some cases, older men with LUTS that were presumed to be caused by an enlarged prostate may have actually started their symptoms at a young age. Thus, periodic follow-up with uroflowmetry and IPSS is suggested. If subjective symptoms and/or objective voiding parameters get worse, medical and/or surgical intervention are needed.

4.1. Treatment for PBNO

Sympathetic nerve dysfunction has been suggested as the main etiology of PBNO. Crowe et al²³ found increased density in the neuropeptide Y-immunoreactive nerves, part of the sympathetic contractile system of the bladder, in patients with bladder neck dysfunction. The adrenergic receptors are abundant in the bladder neck, therefore, the mainstay of medical treatment of PBNO is an α -blocker. Table 2^{11,24–26} summarizes the changes in the urinary flow, PVR, and IPSS in several studies.^{11,24–26} Although a level-one evidence trial in PBNO is lacking, these clinical observations all support the possibility of α -blockers playing an important role in this regard.

The most effective surgical treatment is transurethral incision of the bladder neck (TUIBN). TUIBN is suggested for patients when medical treatment fails or when they seek a long-term therapeutic effect. Turner-Warwick et al²⁷ first introduced the concept of bladder neck incision in 1773. Consequently, Norlen and Blaivas²⁸ reported the promising results of TUIBN in 23 patients with unsuspected proximal urethral obstruction in 1986. Table 3^{4,24,29–31} summarizes the surgical results of TUIBN in recent studies.^{4,24,29,30} All reported that the patients had a decreased IPSS, increased Qmax, and decreased PVR after TUIBN.

The main concern of TUIBN is postoperative retrograde ejaculation in these young men with fertility concerns. Retrograde ejaculation may occur in 27–100% of the patients receiving bilateral TUIBN.^{4,24,29,30} Kochakarn et al³¹ demonstrated unilateral TUIBN had a comparable outcome to bilateral TUIBN. However, they also reported a significant 70% reduction in sperm count from 59.2 million/mL preoperatively to 18.1 million/mL 1 year after surgery. Yang et al²⁹ reported on a modified TUIBN, which preserves the prostate urethra at 0.5–1.0 cm proximal to the verumontanum. All patients reported antegrade ejaculation and improved voiding function. Moreover, the International Index of Erectile Function scores did not change significantly during the 2-year follow-up. This clinical experience suggests that preservation of the supramontanal tissue is the key factor to maintaining antegrade ejaculation and sexual function without jeopardizing the voiding function.

4.2. Treatment of DV

The mainstay of treating DV is urotherapy, which is based on the presumption that dysfunctional voiding may be a learned disorder

Table 3

Summary of therapeutic results after transurethral incision of the bladder neck in young men with primary bladder neck obstruction.

Study	Mean patient age (year)	Technique	Follow up (mo)	IPSS	Qmax (mL/sec)	PVR (mL)	Complication
Kaplan et al, 1994 ⁴ 31 patients	39	Unilateral	6	30/31 improved	Baseline: 9.2 Post-Tx: 15.7	No data	No RE
Trockman et al, 1996 ²⁴ 18 patients	41	Bilateral	12	Baseline: 17.2 ± 5.2 Post-Tx: 4.3 ± 4.5	Baseline: 8.2 ± 4.5 Post-Tx: 26.7 ± 11.8	Baseline: 161 ± 132 Post-Tx: 23 ± 33	4/15 (73%) had RE
Kochakarn et al, 2003 ³¹ 35 patients	40	Unilateral	12	Baseline: 32.1 ± 2 Post-Tx: 14.4 ± 3.6	Baseline: 7.8 ± 2.2 Post-Tx: 15.2 ± 1.6	No data	Sperm count decreased 70%
Yang et al, 2008 ²⁹ 26 patients	42	Modified bilateral 5, 7 o'clock	24	Baseline: 20.7 ± 5.7 Post-Tx: 8.7 ± 4.7	Baseline: 10.7 ± 3.7 Post-Tx: 19.2 ± 4.6	Baseline: 107 ± 77 Post-Tx: 48 ± 25	No RE No change in IIEF
Suri et al, 2005 ³⁰ 18 patients	33	Unilateral 12 o'clock	96	Baseline: 26.9 Post-Tx: 3.6	Baseline: 8.5 Post-Tx: 19.6	No data	2/18 (11%) need 2nd TUIBN

Data are presented as mean ± SD, unless otherwise indicated.

IIEF = International Index of Erectile Function; IPSS = International Prostate Symptom Score; PVR = post-voiding residuals; Qmax = peak urinary flow rate; post-Tx = post-treatment; RE = retrograde ejaculation.

and hence potentially reversible. Urotherapy, referring to a nonsurgical and nonpharmacological treatment, has been considered an effective treatment for dysfunctional voiding even though there are no standardized protocols during the therapy. Basically, urotherapy comprises education for the patient/family, adequate fluid intake, regular optimal voiding regimens, correcting toilet posture, bowel programs, and importantly, pelvic floor muscle awareness and biofeedback training. Several nonrandomized studies in women and children have shown pelvic floor biofeedback training to be effective in treating voiding dysfunction. However, experience with this training in young men is extremely rare. In 1997, Kaplan et al³² reported that 42 young men with pseudo-dyssynergia (dysfunctional voiding) were misdiagnosed as chronic nonbacterial prostatitis. Thirty-five of the patients (83%) had achieved improved symptoms at 6 months, after behavior modification and biofeedback.

Several encouraging studies have reported the efficacy and safety of α -blockers in children with dysfunctional voiding characterized by increased PVR, staccato, or prolonged urine flow, along with elimination diaries.³³ In children, α -blockers can facilitate improved voiding and LUTSs. The benefit of α -blockers can also be seen in men with chronic nonbacterial prostatitis/chronic pelvic pain syndrome which may overlap DV.³⁴

Baclofen, a γ -aminobutyric acid (GABA) agonist, is another potentially effective medication for treating DV. GABAergic interneurons in the spinal cord are responsible for the relaxation of the external urethral sphincter during micturition, thus, baclofen can be used to induce relaxation of the urethral sphincter to improve DV. Although the mechanism of the micturition reflex supports the use of baclofen, the clinical evidence is scarce. Xu and colleagues³⁵ conducted a randomized double-blind, placebo-controlled cross-over trial in 60 women with DV and LUTSs. A 4-week course of baclofen 10 mg three times daily significantly reduced the number of voids/day and increased Qmax. Further studies about dysfunctional voiding in young men are needed in the future.

4.3. Treatment of IDC

Current standard pharmacotherapy for IDC includes the use of muscarinic receptor agonists (e.g., bethanechol) or cholinesterase inhibitors (e.g., distigmine). However, current evidence has shown few beneficial effects of these drugs and an unfavorable effect/side effect profile. In animal studies, capsaicin, resiniferatoxin, and prostaglandin E2 may treat detrusor underactivity by increasing detrusor strength or bladder sensation. However, the clinical applications are still unknown. Consequently, at this point no effective pharmacotherapy for young men with IDC exists. Intermittent clean self-catheterization is suggested in these patients.

4.4. Botulinum toxin in young men with voiding dysfunction

Botulinum toxin (BoNT-A) has been widely used as a novel therapy for various voiding dysfunctions. Lim and Quek³⁶ first injected 100U BoNT-A in eight PBNO patients with a mean age of 37 years. The mean reduction of IPSS was 50% ($19.9 \pm 2.7\%$ vs. $9.9 \pm 1.7\%$, $p = 0.036$) and Qmax increased from 11.6 mL/s to 17.2 mL/s ($p = 0.048$). None reported any adverse effects or ejaculation dysfunction. However, the long-term effect was limited and three of the eight patients had recurrent symptoms after a mean 8 months.

Several clinical studies reported the application of BoNT-A injection into the urethral sphincter to treat DV, IDC, and even chronic urine retention.³⁷ The benefit of a BoNT-A injection has been proven in spinal cord injury patients with detrusor sphincter dys-synergia and in neurologically intact patients with DV. Kuo³⁸ showed a very promising result in 27 patients with idiopathic low detrusor contractility after an urethral injection of either 50 U or 100 U BoNT-A. Of these, 13 (48%) patients recovered detrusor contractility and five (19%) patients had a long-term therapeutic effect without repeating the injection. This report supports the voiding mechanism that relaxation of the external sphincter is an intrinsic component of the voiding reflex.

5. Conclusion

Voiding dysfunction is not an uncommon condition for young men. Although the risk factors for this condition are still not completely understood, uroflowmetry is recommended as an important screening tool for patients with suspected voiding dysfunction. A VUDS is suggested to make an accurate diagnosis in cases of low urine flow. PBNO and DV are the two most common etiologies in young men with voiding dysfunction. The suggested treatment options included medical treatment with an α -blocker, surgical treatment with TUIBN, and urotherapy and/or baclofen for DV. Several reports have shown the effect of BoNT-A injections on voiding dysfunction in these patients. However, these studies usually included small numbers of patients and lacked randomization and a control group. Further well-designed studies are warranted to provide additional evidence of good management techniques for voiding dysfunction in young men.

Conflicts of interest statement

The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

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